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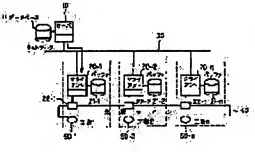
(54) METHOD OF SUPPORTING WORK AND DEVICE THEREFOR



(57)Abstract:
PROBLEM TO BE SOLVED: To provide a method of supporting work and device therefor permitting to instruct an optimal job instruction to workers according to a progress in an actual work.
SOLUTION: The time of starting a system, a scenario file held by a server is transferred to clients 20-1-20-n, and the clients refer to this scenario file and sequentially and automatically provide workers 50-1-50-n posted along production line 40 with job instruction information by using display operation device 22-1-22n. Further, the job instruction information or its timings to be provided to the workers are varied according to the operation of the display operation device 22-1-22-n or progresses in the jobs or degrees of their skills by the workers.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the activity exchange approach and equipment which support an operator's activity by offering workmanship instruction information to operators, such as assembly in FA (factory automation) manufacture site, and processing, inspection operation.

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CLAIMS

[Claim(s)]
[Claim 1] The activity exchange approach characterized by carrying out adjustable [of the workmanship instruction information with which the above-mentioned operator is provided in the activity exchange approach of offering activity exchange, corresponding to actuation of the above-mentioned operator or progress of an activity by offering workmanship instruction information to authorized personnel, or its offer timing].
[Claim 2] The activity exchange equipment characterized by to provide a workmanship-instruction information playback means reproduce the above-mentioned workmanship-

instruction information in the activity exchange equipment which offers activity exchange by offering workmanship-instruction information to authorized personnel, and the control means which carries out adjustable control of the workmanship-instruction information reproduced by the above-mentioned workmanship instruction information playback means, or its playback timing.

[Claim 3] The above-mentioned control means is activity exchange equipment according to claim 2 characterized by controlling the above-mentioned workmanship instruction information playback means to return to the head of the above-mentioned workmanship instruction information corresponding to a re-offer event input, and to reproduce workmanship instruction information.

[Claim 4] The above-mentioned control means is activity exchange equipment according to claim 2 characterized by controlling the above-mentioned workmanship instruction information playback means for the above-mentioned workmanship instruction information to progress per a file or coma corresponding to a file, coma progress, or a return event input, or to return, and to be reproduced.

[Claim 5] The above-mentioned control means is activity exchange equipment according to claim 2 characterized by controlling the above-mentioned workmanship instruction information playback means so that the above-mentioned workmanship instruction information is reproduced based on the operation standard time amount according to an operator's skill level.

[Claim 6] The server which carries out record or read-out for data to the database which memorized two or more activity scenarios which responded to two or more work contents, Have the client which controls a storage means and a display means, and it answers that generating of an event which serves as a start-up trigger according to a work content from a client side is told to a server. Activity exchange equipment characterized by displaying an activity that an activity progresses according to the scenario which transmitted the scenario of said work content to said client side from the server, memorized the scenario from a server for the storage means in the client side, and was memorized for this storage means after that on a display means.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the activity exchange approach and equipment which support an operator's activity by offering workmanship instruction information to operators, such as assembly in FA (factory automation) manufacture site, and processing, inspection operation.
[0002]
[Description of the Prior Art] Conventionally, the approach of summarizing the content of workmanship instruction to an operator in written form as this kind of the activity exchange approach, and distributing to each operator is taken.
[0003] That is, in FA manufacture site, when an on-site operator works an assembly / inspection / maintenance, the work procedure instruction sheet of the paper base is drawn up, activity education is carried out based on the procedure, and the real activity is done with reference to the work habits of the paper base with the real line.
[0004] However, there is a problem as shown below in the above-mentioned conventional paper base work procedure instruction sheet and activity education.
[0005] 1) In order to make it an intelligible work procedure instruction sheet, creation mandays, such as a transpicuous figure form, solid-figure-izing, and photograph-izing, become large.
[0006] 2) Document-izing (actuation of an operator based on a motion of color information, a hour entry, sound information, and a machine etc.) of field-work know how is difficult.
[0007] 3) Activity [, such as instruction to an unfamiliar operator (a newcomer, PERT) to pierce,] educational manday becomes large.
[0008] 4) Initiation of activity know how does not go smoothly, but a leak generates it.
[0009] 5) Since the content of the work habits accompanying limited production with a wide variety becomes complicated, a work content is not memorized.
[0010] 6) It must work by taking out the corresponding work procedure instruction sheet (paper) from a cabinet for every housekeeping substitute.
[0011] 7) The quick response manday of the change-work communication by a design change etc. is large, and difficult also for thoroughness of the content of modification.
[0012] 8) The variation in the lack of skill of an operator or skill occurs, many manufacture troubles occur, and the variation in the increment in response manday, operating ratio lowering, and a quality of conformance etc. occurs.
[0013] Then, it is made the information which utilizes an image, voice, etc. for JP,7-64465,A seeing, and is easier to understand workmanship instruction information intuitively, and electronic and the assembly-operation procedure directions approach which solved the above-mentioned problem by providing through a network are proposed in it.
[0014] Specifically, the assembly-operation procedure directions approach indicated by above-mentioned JP,7-64465,A is controlled by the following procedures.
[0015] 1) Transmit workmanship instruction information to the client from the server beforehand.
[0016] 2) Send the command about the time amount of which displays which information on a client from a server based on a work plan at the time of employment.
[0017] 3) A client reproduces the workmanship instruction information memorized by self

according to this command.
[0018]
[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional activity exchange approach, since the repeat display of the workmanship instruction (mechanically) information is only carried out as the work plan to the on-site operator to the last, to the demand by the side of an operator, or the progress condition of an activity, it is not taken into consideration at all, but the work plan is done minutely, and only when the activity is done favorably, it becomes validity.
[0019] For example, when the skill level of the case where a work plan is rude, or an operator varies, it does not necessarily operate effectively. For an operator with high skill level, the situation on which I want you to display the following work content early is also produced, and the situation of wanting you to display a work content a little longer is also produced for an operator with low skill level.
[0020] That is, if it was in the conventional activity exchange approach which merely carries out the repeat display of the workmanship instruction information mechanically, it did not restrict that the need and exact workmanship instruction information were acquired for an operator, but there was a problem that improvement in effective working efficiency was not expectable with this.
[0021] Then, this invention aims at offering the activity exchange approach and equipment which enabled it to show an operator the optimal workmanship instruction information corresponding to the progress condition of a real activity.
[0022]
[Means for Solving the Problem] In order to attain the above-mentioned object, invention of claim 1 is characterized by carrying out adjustable [of the workmanship instruction information with which the above-mentioned operator is provided in the activity exchange approach of offering activity exchange, corresponding to actuation of the above-mentioned operator or progress of an activity by offering workmanship instruction information to authorized personnel, or its offer timing].
[0023] Moreover, invention of claim 2 is characterized by to provide a workmanship-instruction information playback means reproduce the above-mentioned workmanship-instruction information in the activity exchange equipment which offers activity exchange by offering workmanship-instruction information to authorized personnel, and the control means which carries out adjustable control of the workmanship instruction information reproduced by the above-mentioned workmanship instruction information playback means, or its playback timing.
[0024] Moreover, invention of claim 3 is characterized by the above-mentioned control means controlling the above-mentioned workmanship instruction information playback means to return to the head of the above-mentioned workmanship instruction information corresponding to a re-offer event input, and to reproduce workmanship instruction information in invention of claim 2.
[0025] Moreover, invention of claim 4 is characterized by the above-mentioned control means controlling the above-mentioned workmanship instruction information playback means for the above-mentioned workmanship instruction information to progress per a file or coma corresponding to a file, coma progress, or a return event input, or to return, and to be reproduced in invention of claim 2.
[0026] Moreover, invention of claim 5 is characterized by the above-mentioned control means controlling the above-mentioned workmanship instruction information playback means so that the above-mentioned workmanship instruction information is reproduced based on the operation

standard time amount according to an operator's skill level in invention of claim 2.
[0027] Moreover, the server which carries out record or read-out for data to the database which memorized two or more activity scenarios with which invention of claim 6 responded to two or more work contents, Have the client which controls a storage means and a display means, and it answers that generating of an event which serves as a start-up trigger according to a work content from a client side is told to a server. It is characterized by displaying an activity that an activity progresses according to the scenario which transmitted the scenario of said work content to said client side from the server, memorized the scenario from a server for the storage means in the client side, and was memorized for this storage means after that on a display means.
[0028]
[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained to a detail with reference to an accompanying drawing.
[0029] Drawing 1 shows the gestalt of 1 operation of the activity support system constituted with the application of the activity exchange approach and equipment concerning this invention with a block diagram.
[0030] In drawing 1 , this activity support system offers workmanship instruction information to two or more on-site operators 50-1 stationed for every process of a production line 40 - 50-n, and is built as a client/server architecture which consists of a server 10, and two or more clients 20-1 connected to this server 10 through a network 30 - 20-n.
[0031] The database 11 which accumulates the workmanship instruction information which consists of image information etc. is connected to the server 10.
[0032] Moreover, a buffer 21-1 - 21-n, and the device 22-1 for display actuation - 22-n are connected to a client 20-1 - 20-n.
[0033] Here, a buffer 21-1 - 21-n store the workmanship instruction information transmitted from a server 10 by the demand from the scenario file transmitted from a server 10 at the time of the start-up of this system and a client 20-1 - 20-n.
[0034] Moreover, the device 22-1 for display actuation - 22-n are for acquiring workmanship instruction information etc. through a client 20-1 - 20-n, when the on-site operator 50-1 - 50-n carry out a direct control.
[0035] It is accumulated in a database 11 and the workmanship instruction information transmitted to a client 20-1 - 20-n from a server 10 by the demand from a client 20-1 - 20-n consists of files which described the concrete content of directions of an activity element. This workmanship instruction information is expressed by an image, a still picture, animation, voice, the text, etc. in order to tell an on-site operator the content of workmanship instruction intelligibly.
[0036] By the way, since that amount of information becomes extensive, the way things stand, the traffic on a network 30 increases and image data, such as an image, a still picture, and animation, has the problem of reducing the transfer efficiency of the data transfer between a server 10, and a client 20-1 - 20-n.
[0037] Then, in the activity support system of the gestalt of this operation, in case the image data compressed into the database 11 connected to a server 10 is accumulated and this image data is transmitted to a client 20-1 - 20-n, it constitutes so that image data [this having compressed] may be transmitted to a client 20-1 - 20-n as it is, and it is constituted so that this compressed image data may be elongated by the client 20-1 - 20-n side. Therefore, the image expanding function which elongates the compressed image data is carried in a client 20-1 - 20-n.
[0038] If compression/expanding of image data are for example, still picture data, and it is JPEG

specification and a video data, it can adopt the technique of Motion-JPEG, and MPEG specification.
[0039] By the way, in this kind of activity support system, demand of wanting to cut down the screen of arbitration and to check the content from a viewpoint of workmanship instruction even if it is an animation is strong. In order to fill this demand, the technique which it is only more desirable to presuppose that it is to carry out space compression of the image data for every coma which constitutes an image, and is known as above-mentioned Motion-JPEG is suitable.
[0040] That is, since the technique by MPEG is using together space compression and time amount compression, even if it is at the compression event, coma omission occurs and it specifies the coma of arbitration, it cannot carry out the repeat display of this.
[0041] Then, in the activity support system of the gestalt of this operation, the high speed and the method reproduced continuously are adopted [the dynamic image] for the still picture based on the method of Motion-JPEG. Here, reproduction speed is based for example, on 30 coma / second (NTSC standard).
[0042] Although attaching a number and the address to each of static images uniquely as an approach of cutting down a certain specific static image can also be realized, since it can display uniformly [1 / 30 seconds] and can go per screen when adopting a high speed and the method reproduced continuously for a still picture based on the method of Motion-JPEG, it is possible to cut down a certain specific static image by time-of-day assignment using this.
[0043] Then, in the activity support system of the gestalt of this operation, a timer is set at the time of image reconstruction, and the value of this timer and the playback screen of an image are associated. Coma control which specified the coma of the arbitration of a playback image by referring to the value of this internal timer by such technique is realized.
[0044] The scenario file which is accumulated in a database 11 and transmitted to a client 20-1 - 20-n from a server 10 at the time of the start-up of this activity support system is a text-based file currently prepared for every object form of an activity. This scenario file is referred to at the time of automatic activation of this activity support system, and it is described how much which directions file being read in which sequence and its playback time amount are.
[0045] Reading appearance of this scenario file is carried out to a client 20-1 - 20-n by generating of the start-up event at the time of this system startup from a server 10, and shift is held at the buffer 21-1 connected to a client 20-1 - 20-n - 21-n. By such configuration, although automatic activation of this activity support system is carried out, the addition of management of the event started by the on-site operator side is enabled easily. That is, it becomes easy to cope with the event which an on-site operator starts by action which is in a scenario file beforehand.
[0046] By constituting this scenario file, by specifying the file which should be carried out reading appearance next at the time of automatic activation of this activity support system in this scenario file, each workmanship instruction file does not need to add the data for reading the next file, and can raise the independence and reusability as a work file. It becomes unnecessary that is, to give chain structure to a file. In addition, this scenario file is referred to from the running routine in a client 20-1 - 20-n.
[0047] In this activity support system, that operator guidance is inputted from the device 22-1 for display actuation - 22-n to operate a playback screen to an on-site operator side in the condition of carrying out automatic activation of the playback of workmanship instruction information. As a means to input this operator guidance, the input device made only for these activity support systems besides a keyboard and a mouse can be used. This directions input means will turn into a trigger generating means of an event, if it sees from the above-mentioned scenario file.

[0048] Drawing 2 shows an example of the above-mentioned scenario file. The scenario file shown in this drawing 2 is 1 event number.
2) It had the item of the name of the event of playback time amount 5 degree of event name 3 playback designated file name 4 file, and the scenario which repeats a file 3 and is endlessly reproduced from a file 1 is described.
[0049] Drawing 3 shows the internal program structure of a client 20-1 - 20-n with a block diagram.
[0050] In drawing 3 , the program 20 inside a client consists of a running routine 201, a scenario file 202, event detection, and a specific routine 203. This program 20 operates by the trigger input of the event from display actuation input device group 22a and input device group 22b of on-site information.
[0051] display actuation input device group 22a which an operator operates here -- 1 keyboard 204-12 mouse 204-23 touch-panel 204-34 bar-code-reader 204-N etc. -- it is -- input device group 22b of on-site information -- the switch 205-12 timer 205-23 various 1 various sensors 205-34 -- in addition to this, various input unit 205-M is contained.
[0052] That is, if a manipulate signal occurs from variety hardware which a timer 205-2 and an on-site operator operate, this will be raised to event detection and the specific routine 203 as a trigger signal of an event. By event detection and the specific routine 203, these input devices are supposed, and it recognizes what kind of event only went up, and notifies to a running routine 201 by making this into the detecting signal matched beforehand.
[0053] Only the class of event this detecting signal has been recognized to be exists, and that class has the following.
1) the halt 5 of a system of deadline 4 file playback of termination 3 timer of start-up 2 system -- the restart of a regeneration 8 file playback halt from the regeneration 7 head file of a file [degree] display 6 present file -- these are specified according to event specification logic as shown in the flow chart of drawing 4 explained below.
[0054] In addition, as mentioned above, by dividing a running routine 201 and the scenario file 202 clearly, the content of activation can be easily changed only by rewriting a scenario file, and the versatility can be raised.
[0055] Drawing 4 shows actuation of the client 20-1 in the activity support system of the gestalt of this operation - 20-n with a flow chart.
[0056] In drawing 4 , it is investigated first whether it is a start-up event (step 231).
[0057] By the way, in the activity support system of the gestalt of this operation, since it is constituted so that it may make into a trigger for the employment start of activity exchange to read the bar code (work content) uniquely attached for example, to the object for an activity by bar code reader 204-N shown in drawing 3 , it is investigated by whether whether it is the start-up event of step 231 had the reading input of bar code reader 204-N.
[0058] That is, the running routine 201 shown in drawing 3 has determined beforehand the specific trigger for carrying out a start-up, as mentioned above, and if the event detection and the specific routine 203 which showed the trigger to drawing 3 detect, it will require a transfer of a scenario file from a server 10 as a start-up event.
[0059] Henceforth, a client holds a scenario file and performs offer of a workmanship instruction file automatically with reference to this scenario file for every below-mentioned deadline event generating.
[0060] That is, next, if it investigates whether it is scenario file arrival (step 232) and is not scenario file arrival (it is No at step 232), it will return to step 231 and will wait for scenario file

arrival, but if scenario file arrival, i.e., a scenario file, is received (it is Yes at step 232), the running routine 201 of a client will perform offer of a workmanship instruction file automatically from the head of this scenario file as the sequence described by the scenario file.
[0061] first, the name of the event of the head of a scenario file -- referring to -- 1 designated-file reading appearance -- carrying out -- 2 -- it memorizes to a local buffer (a buffer 21-1 - 21-n) (step 233). (writing)
[0062] Next, while setting an event name and a timer and memorizing the file playback start of an assignment event, i.e., the event name of this scenario file, the internal timer of a running routine 201 is set based on the playback time data beforehand set to this scenario file, and the file playback from a local buffer is started (step 234).
[0063] And although it will return to step 235 and will wait for event input detection if it investigates whether they are event detection and event input detection by the specific routine 203 (step 235) and an event input is not detected (it is No at step 235), this detected event investigates a termination event as it is judged that it is event input detection (step 236). (it is Yes at step 235)
[0064] Here, actuation of this system is ended as this detected event is a termination event (it is Yes at step 236).
[0065] Moreover, when it is judged at step 236 that this detected event is not a termination event, No), next this detected event investigate whether it is a deadline event at the (step 236 (step 237).
[0066] Here, when this detected event is a deadline event, with reference to Yes) and the scenario file 202, degree event is recognized at the (step 237 (step 239), a timer count is reset (step 240), and it returns to step 234.
[0067] Moreover, when it is judged at step 237 that this detected event is not a deadline event, No), next this detected event investigate whether it is a regeneration event at the (step 237 (step 238).
[0068] Here, although it returns to No) and step 235 at the (step 238 when this detected event is not a regeneration event, when this detected event is a regeneration event, with reference to Yes) and a head event name, a head event is recognized at the (step 238 (step 241), a timer count is reset (step 240), and it returns to step 234.
[0069] That is, the running routine 201 of a client will go the scenario file 202 to reading based on a current event number [finishing / storage], if the deadline event by deadline of a file is inputted. Since the file name which should be read next is described there, this goes the next file to reading. Thus, the scenario file 202 is referred to by making generating of a deadline event into a trigger.
[0070] Moreover, if the event of a class different from deadline is notified to the running routine 201 of a client through event detection and the specific routine 203, a running routine 201 will specify the class of the event, and will perform display actuation corresponding to it.
[0071] Here, although the input device is various, operator guidance and a corresponding event class have taken the response beforehand, and are built in in event detection and the specific routine 203. Thereby, it specifies what kind of operator guidance event it is, and a specific result is notified to a running routine 203. By this specific result, a running routine 201 refers to a scenario file, or operates a timer value.
[0072] For example, the next file is read after acquiring the following event name with reference to a scenario file like a deadline event based on the event name under current activation, when an operator does the next file display directions. When a refresh file changes, a timer is reset again.
[0073] Reading appearance of the present file name is again carried out only by referring to a

current event name to rereproduce from the beginning during current file playback. A timer is set again.
[0074] Moreover, by treating termination as one of the events, if termination directions are inputted, a system can be ended.
[0075] Drawing 5 shows the example of a display of the device 22-1 for display actuation in the activity support system of the gestalt of this operation shown in drawing 1 - 22-n.
[0076] In the example of a display shown in this drawing 5 , it is constituted [as seeming / it / that the detail data of the workmanship instruction information corresponding to eight processes of ** - ** can be displayed] like. Here, the notes of this detail data are constituted so that it may emphasize intelligibly by a flash and migration of an alphabetic character. In addition, this workmanship instruction information is retrieved from a server 10 to a work item, and is displayed on the client terminal 22-1 of a field work -, i.e., the device for display actuation, and 22-n.
[0077] As mentioned above, as shown below, it is constituted in the activity support system of the gestalt of this operation.
[0078] 1) Based on the image which carried out video photography of field-work actuation or the product information, workmanship instruction information can be easily created / chosen as an animation/a still picture.
[0079] 2) Offer the content of workmanship instruction as visual and intelligible multimedia activity support information using an image (an animation/still picture), voice, an alphabetic character, a notation, activity auxiliary information, etc.
[0080] 3) The activity support information of arbitration can be chosen and connected, and it considers as the scenario file which can describe each activity display time, it is made the configuration which can perform related attachment by further two or more activity information and on-site information, and can register with a SAPA side (database) with activity support information.
[0081] 4) In a client side, detect the trigger signal of on-site information as an event, give the function in which the activity support information of relevance can be searched, and give the function which displays activity support information continuously along with the scenario file by the side of a server.
[0082] According to such a configuration, the following effectiveness is expectable.
[0083] 1) The improvement in skill / many-skilled worker-ization of skill labor are supportable.
a. From on-site information (BCR), the optimal activity information which an operator needs can be offered automatically.
b. Also by the complicated activity accompanying limited production with a wide variety, it can work without a mistake.
c. Emphasis (voice / notation / auxiliary information) of the activity point can also be performed, and an activity mistake / POKAMISU can be reduced.
d. Since it is visual and intelligible, the improvement in skill of an on-site operator can plan at an early stage.
[0084] 2) It can respond to a skilled worker's technical tradition.
a. A skilled worker's activity know how is converted into a video signal, and unitary management can be carried out as visual activity information.
b. Leveling and improvement in an operating ratio can be aimed at by equalization of the activity skill by the newcomer/veteran.
[0085] 3) The cutback of the manufacturing cost / indirect manday by the visual formation of

activity support information can be aimed at.
a. The activity educational manday for the improvement in early skill is reducible.
b. Indirect mandays, such as an inquiry, are reducible for the improvement in skill / many-skilled-worker-izing of an on-site operator.
c. From the video image in a prototype line, intelligible work-habits creation can be created easily.
d. Indirect mandays, such as revision / communication / thoroughness by unitary management of a work procedure instruction sheet, are reducible.
[0086] Next, the gestalt of other operations of this invention that adjusts and enabled it to operate the playback timing of the workmanship instruction information offered by this activity support system from an operator side according to the progress condition of a real activity is explained.
[0087] According to the gestalt of this operation, the time deflection at the time of a real activity is doubled with the actual condition of a site to the directions information with which a target is provided on the other hand from a system, and the operator itself can be controlled now.
[0088] For example, in an operator with high skill level, it can perform that fly known directions information and only an unknown part indicates by halt. Moreover, since informational call timing is controllable according to progress of a real activity, even if a work plan is coarse, it becomes possible to take into consideration progress of the real activity by the site side.
[0089] Drawing 6 shows actuation of the client in the activity support system of the gestalt of other operations of this invention constituted in this way with a flow chart.
[0090] In addition, in the gestalt of this operation, although that fundamental configuration can use the same thing as the configuration shown in drawing 1 thru/or drawing 3 , in the activity support system of the gestalt of this operation, the following is used as a class of that detecting signal.
[0091] 1) coma progress [0092 from the image of the image of regeneration 8 this time of the display 7 present file of a restart 6 degree file of a halt 5 file playback halt of a system of deadline 4 file playback of termination 3 timer of start-up 2 system to coma return 9 this time --] In drawing 6 , it is investigated first whether it is a start-up event (step 211).
[0093] It is investigated by whether there was any reading input of bar code reader 204-N which showed drawing 2 whether it was the start-up event of this step 211.
[0094] Next, it investigates whether it is scenario file arrival (step 212), if it is not scenario file arrival (it is No at step 212), it will return to step 212 and will wait for scenario file arrival, but if scenario file arrival, i.e., a scenario file, is received (it is Yes at step 212), the running routine 201 of a client will perform offer of a workmanship instruction file automatically from the head of this scenario file as the sequence described by the scenario file.
[0095] first, the name of the event of the head of a scenario file -- referring to -- 1 designated-file reading appearance -- carrying out -- 2 -- it memorizes to a local buffer (a buffer 21-1 - 21-n) (step 213). (writing)
[0096] Here, it writes in a local buffer (a buffer 21-1 - 21-n) for realizing progress by a below-mentioned coma unit and a below-mentioned workmanship instruction file unit, and return actuation, and performing it at a high speed at the same time it prevents decline in the working efficiency by getting information from a server 10 one by one, and transfer efficiency.
[0097] Next, an event name and a timer are set and the file playback start of an assignment event is performed (step 214). And although it will return to step 215 and will wait for event input detection if it investigates whether they are event detection and event input detection by the specific routine 203 (step 215) and an event input is not detected (it is No at step 215), this

detected event investigates a termination event as it is judged that it is event input detection (step 216). (it is Yes at step 215)
[0098] Here, actuation of this system is ended as this detected event is a termination event (it is Yes at step 216).
[0099] Moreover, when it is judged at step 216 that this detected event is not a termination event, No), next this detected event investigate whether it is a deadline event at the (step 216 (step 217).
[0100] Here, when this detected event is a deadline event, with reference to Yes) and the scenario file 202, degree event is recognized at the (step 217 (step 218), a timer count is reset (step 219), and it returns to step 214.
[0101] Moreover, when it is judged at step 217 that this detected event is not a deadline event, No), next this detected event investigate whether it is a resumption event of a halt at the (step 217 (step 221).
[0102] Here, when this detected event is a resumption event of a halt, the count of Yes) and a timer is resumed at the (step 221 (step 222), and it returns to step 215.
[0103] Moreover, when it is judged at step 221 that this detected event is not a resumption event of a halt, No), next this detected event investigate whether it is a halt event at the (step 221 (step 223).
[0104] Here, when this detected event is a halt event, the count of Yes) and a timer is halted at the (step 223 (step 224), and it returns to step 215.
[0105] Moreover, by step 223, when this detected event is not a halt event, No), next the object for actuation investigate a file or a coma at the (step 223 (step 225).
[0106] When the object for actuation is a file next, progress of this file or return is investigated here (step 226). In progress Degree event is recognized with reference to the scenario file 202 (step 218), and a timer count is reset (step 219). To step 214 in the case of return and return A current event is recognized with reference to a current event name (step 220), a timer count is reset (step 219), and it returns to step 214.
[0107] Moreover, when it is judged at step 225 that the object for actuation is a coma Progress of this coma or return is investigated (step 227). Next, in progress One timer count is advanced and it changes into the condition of a halt, i.e., coma delivery, (step 228), and one timer count is returned, in the case of return and return, it changes into the condition of a halt, i.e., coma return, (step 229), and it returns to step 215 at step 215.
[0108] That is, the running routine 201 of a client will go the scenario file 202 to reading based on a current event number [finishing / storage], if the deadline event by deadline of a file is inputted. Since the file name which should be read next is described there, this goes the next file to reading. Thus, the scenario file 202 is referred to by making generating of a deadline event into a trigger.
[0109] Moreover, if the event of a class different from deadline is notified to the running routine 201 of a client through event detection and the specific routine 203, a running routine 201 will specify the class of the event, and will perform display actuation corresponding to it.
[0110] Here, although the input device is various, operator guidance and a corresponding event class have taken the response beforehand, and are built in in event detection and the specific routine 203. Thereby, it specifies what kind of operator guidance event it is, and a specific result is notified to a running routine 203. By this specific result, a running routine 201 refers to a scenario file, or operates a timer value.
[0111] For example, the next file is read after acquiring the following event name with reference to a scenario file like a deadline event based on the event name under current activation, when an

operator does the next file display directions. When a refresh file changes, a timer is reset again.
[0112] Reading appearance of the present file name is again carried out only by referring to a current event name to rereproduce from the beginning during current file playback. A timer is set again.
[0113] When a halt of a screen is directed, a screen also halts a timer count while indicating by halt.
[0114] When coma delivery and coma return are directed, coma actuation is performed on the basis of a current timer value. At this time, coma delivery actuation is attained by operating timer counted value by the time amount concerning playback of one coma having been decided beforehand, and making the timer value and the screen interlock.
[0115] It is adding the playback time amount for one coma to a current timer value, and is 1 coma ****. Or if it subtracts from a current timer value, it will be 1 coma ****.
[0116] In addition, if restart directions are carried out after any of a halt, coma delivery, and coma return, or actuation, a timer count will resume from the event.
[0117] Moreover, by treating termination as one of the events, if termination directions are inputted, a system can be ended.
[0118] It is as follows when the description of the activity support system of the gestalt of the above-mentioned implementation is shown.
[0119] 1) Treat all workmanship instruction information as the aggregate of a still picture. Thereby, playback actuation in a coma unit is enabled by time-of-day (timer value) assignment.
[0120] 2) Manage the scenario file which described the order of playback and playback time amount for carrying out automatic activation not by the server but by the client. Thereby, it becomes easy about the actuation input from a client to perform an event with reference to a scenario file to a trigger. Moreover, since [which rewrites a scenario file] only, modification of system behavior is also easy for the content of activation over an event.
[0121] 3) In order to carry out operator guidance from an operator, equip a client with the input unit which generates the trigger signal of an event. As an event, by the event detection in a client, and the specific routine, all the operator guidance from this input device has the content interpreted, and is performed.
[0122] 4) It is a form of an event for the activity element information required by the way which is the need, for example, call new workmanship instruction information from a server, or actuation of playback in a coma unit, halting is enabled for the information under present playback.
[0123] 5) Although automatic activation of the presentation of workmanship instruction information is carried out, by having made it a configuration which is the need and which can operate and check workmanship instruction information by the operator side by the way, the effectiveness of not spoiling productive efficiency as a result is acquired.
[0124] Next, the gestalt of the implementation of further others of this invention that enabled it to adjust the timing of automatic playback of directions information from an operator side with an operator's skill level is explained.
[0125] In the gestalt of this operation, since the time deflection at the time of a real activity is doubled with an operator's skill level to the directions information with which a target is provided on the other hand from a system and the operator itself can be controlled, even if a work plan is coarse, it becomes possible to take into consideration progress of the real activity by the site side.
[0126] Drawing 7 shows an example of a deviation multiplier table with the operation standard

time amount based on the grade of the skill level used with the activity support system of the gestalt of this operation.
[0127] This deviation multiplier table defines an operator's skill level as a grade, and specifies a deviation multiplier with standard operation time in each grade. In the activity support system of the gestalt of this operation, automatic calculation of the working hours according to an operator's skill level is carried out from operation standard time amount on the basis of this deviation multiplier, and workmanship instruction information is offered based on these computed working hours.
[0128] As this deviation multiplier table is prepared for every object form of an activity and is shown in drawing 7 , the deviation multiplier with the standard operation time for every work content corresponding to the skill level inputted as an event by the client side is described.
[0129] At first, the file this deviation multiplier table was described to be is put on the server side, and reading appearance is carried out to a client side by generating of the start-up event at the time of starting of a system, and it is held by the client side with a scenario file henceforth. Although automatic activation of the offer of workmanship instruction information is carried out by this, an addition becomes possible easily about management of the event started by the operator side.
[0130] By constituting this file, an injury easy next door with relation with the activity of a scenario file, and the independence and reusability of a scenario file can be raised in automatic activation of offer of workmanship instruction information. This file is referred to from the running routine 201 of a client so that it may become clear from the flow chart shown below.
[0131] Drawing 8 shows actuation of a client [in / further / the activity support system of the gestalt of other operations] of this invention constituted in this way with a flow chart.
[0132] In addition, also in the gestalt of this operation, although that fundamental configuration can use the same thing as the configuration shown in drawing 1 thru/or drawing 3 , in the activity support system of the gestalt of this operation, the following is used as a class of that detecting signal.
[0133] 1) Skill level of regeneration 6 operator of the display 5 present file of a deadline 4 degree file of termination 3 timer of start-up 2 system of a system [0134] In drawing 8 , it is investigated first whether it is a start-up event (step 251).
[0135] Next, it is investigated whether it is scenario file / mastery table arrival (step 252). If it is not scenario file / mastery table arrival (it is No at step 252) Although it returns to step 251 and waits for scenario file / mastery table arrival That it is scenario file / mastery table arrival the running routine 201 of a client (it is Yes at step 252) the name of the event of the head of a scenario file -- referring to -- 1 designated-file reading appearance -- carrying out -- 2 -- it memorizes to a local buffer (a buffer 21-1 - 21-n) (step 253).
[0136] Next, it investigates whether it is a skill level event (step 254), when it is not a skill level event, it waits for return and a skill level event to No) and step 254 at the (step 254, but when it is a skill level event, storage is processed from Yes) and a skill level table at the (step 254 to the buffer (a buffer 21-1 - 21-n) of two local which computes the multiplier of one allowed time (step 255).
[0137] And an event name and a timer are set and the file playback start of an assignment event is performed (step 256).
[0138] Next, although it will return to step 257 and will wait for event input detection if it investigates whether they are event detection and event input detection by the specific routine 203 (step 257) and an event input is not detected (it is No at step 257), this detected event

investigates a termination event as it is judged that it is event input detection (step 258). (it is Yes at step 257)
[0139] Here, actuation of this system is ended as this detected event is a termination event (it is Yes at step 257).
[0140] Moreover, when it is judged at step 257 that this detected event is not a termination event, No), next this detected event investigate whether it is a deadline event at the (step 257 (step 259).
[0141] Here, when this detected event is a deadline event, with reference to Yes) and the scenario file 202, degree event is recognized at the (step 259 (step 260), a timer count is reset (step 261), and it returns to step 256.
[0142] Moreover, step 259 is repeated from step 257 until it is judged as return at the (step 259 when it is judged at step 259 that this detected event is not a deadline event, and it is judged to be a deadline event by No) and step 257 at step 259.
[0143] The description in the activity support system of the gestalt of the above-mentioned implementation is as follows.
[0144] 1) Define an operator's skill level as two or more grades, and offer workmanship instruction information based on the time amount which carried out automatic calculation of the working hours according to an operator's skill level on the basis of the table which specified the deviation multiplier with job standard time in each grade, and its multiplier.
[0145] 2) Manage the scenario file which described the order of playback and operation standard time amount for carrying out automatic activation not by the server but by the client. Thereby, it becomes easy about the actuation input from a client to perform an event with reference to a scenario file to a trigger. Moreover, since [which rewrites a scenario file] only, modification of system behavior is also easy for the content of activation over an event.
[0146] 3) In order to carry out operator guidance from an operator, equip a client with the input unit which generates the trigger signal of an event. From this input device, all of the information which recognizes skill level, or activity operator guidance have the content interpreted by the event detection in a client, and the specific routine as an event, they are performed, and as an event, by the event detection in a client, and the specific routine, all operator guidance has the content interpreted and is performed.
[0147] 4) Modification of the operation standard time amount based on an operator's skill level is attained, and the effectiveness of not spoiling productive efficiency as a result is acquired by having made it the configuration which can offer the activity information according to skill level.
[0148] In addition, in the gestalt of implementation of all above, although the case where the activity support system concerning this invention was built as a client/server architecture was shown, this invention can be similarly constituted, even if it applies to the workmanship instruction system without a network which makes automatic offer only with a local machine. In this case, it is only that a client-server gestalt is lost and there will be a workmanship instruction file and a scenario file locally from the beginning.
[0149] Moreover, this invention cannot be concerned with network existence, but can also be applied to a system without the automatic offer function of workmanship instruction. In this case, although it becomes the system in which that it is only event-driven makes information offer, it can apply to the application of the maintenance information offer system rarely used, for example, and becomes the maintenance information offer system which rewrites the content of an event "for the data of I/O beforehand associated according to the error code to be read and saved". ["a maintenance directions file is read according to an error code",]
[0150] Moreover, this invention can also apply a work environment system which treats only the

workmanship instruction file of only a still picture without a dynamic image. In this case, it is only that the operating concept in a coma unit is lost, and can apply to a halt or the call of another work file as it is.
[0151] Moreover, this invention is applicable also to the real-time monitoring system which compresses an image into real time and is supplied to a client by connecting a picture compression function and a video camera to a server. In this configuration, it can regard as a directions event specifying displaying the image from the camera connected to the server on a screen. Moreover, the connecting location of a camera may be the machine which did not matter not only in the server, but connected with the network, and was equipped with the picture compression function.
[0152] Moreover, as a directive command of the information offered, it can halt, and it advances, and it can return and can apply to except similarly about functions, such as a termination and a restart.
[0153] Moreover, cache memory besides mass storage, such as a hard disk, can also use a buffer.
[0154] Moreover, input devices may be various switches besides being others, a touch panel and a switch, a bar code reader, a scanner, ID card reader, etc., various sensors, or the exclusive input device made combining them. [keyboard / general-purpose]
[0155]
[Effect of the Invention] Since it constituted according to this invention so that it could carry out adjustable [of the workmanship instruction information with which an operator is provided corresponding to actuation of an operator or progress of an activity, or its offer timing] as explained above, while being able to show an operator the optimal workmanship instruction information corresponding to the progress condition of a real activity and being able to aim at improvement in productive efficiency, effectiveness as taken further below is done so.
[0156] 1) The improvement in skill / many-skilled worker-ization of skill labor are supportable.
[0157] 2) It can respond to a skilled worker's technical tradition.
[0158] 3) The cutback of the manufacturing cost / indirect manday by the visual formation of activity support information can be aimed at.
[0159] 4) Although automatic activation of the presentation of workmanship instruction information is carried out, when required, workmanship instruction information can be operated and checked by the operator side, and don't spoil productive efficiency.
[0160] 5) It becomes easy about the actuation input from a client to perform an event with reference to a scenario file to a trigger, and since [which rewrites a scenario file] only, modification of system behavior is also easy for the content of activation over an event.
[0161] 6) Modification of the operation standard time amount based on an operator's skill level is attained, and improvement in productive efficiency can be aimed at.

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The block diagram showing the gestalt of 1 operation of the activity support system constituted with the application of the activity exchange approach and equipment concerning this invention.
[Drawing 2] Drawing having shown an example of the scenario file used with the activity support system shown in drawing 1 .
[Drawing 3] The block diagram having shown the internal program structure of the client in the activity support system shown in drawing 1 .
[Drawing 4] The flow chart which shows actuation of the client in the activity support system shown in drawing 1 .
[Drawing 5] Drawing having shown the example of a display of the device for display actuation in the activity support system shown in drawing 1 .
[Drawing 6] The flow chart which shows actuation of the client in the activity support system of the gestalt of other operations of this invention.
[Drawing 7] Drawing showing an example of a deviation multiplier table with the operation standard time amount based on the grade of the skill level of this invention further used with the activity support system of the gestalt of other operations.
[Drawing 8] The flow chart which shows actuation of a client [in / further / the activity support system of the gestalt of other operations] of this invention using the deviation multiplier table shown in drawing 7 .
[Description of Notations]
10 Server
11 Database
20-1 - 20-n Client
21-1 - 21-n Buffer
22-1 - 22-n Device for display actuation
22a The display actuation input device group which an operator operates
22b The input device group of on-site information
50-1 - 50-n On-site operator
201 Running Routine
202 Scenario File
203 Event Detection, Specific Routine
204-1 Keyboard
204-2 Mouse
204-3 Touch Panel
204-N Bar code reader
205-1 Various Switches
205-2 Timer
205-3 Various Sensors
205-M In addition, various input units

[Translation done.]

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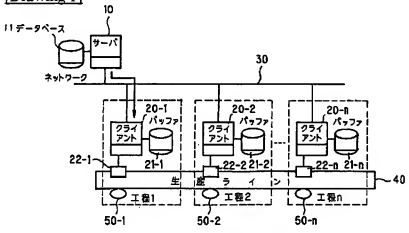
DRAWINGS

[Drawing 1]



[Drawing 2]

〈シナリオファイルの例(エンドレス1からファイル3を繰り替えし再生するシナリオ)〉

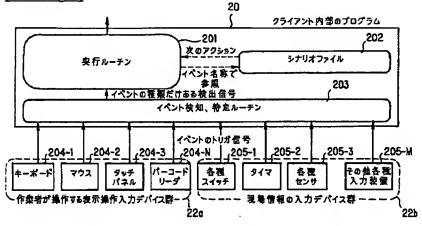
イベント番号	イベント名称	再生指定ファイル名	ファイルの再生時間	次のイベント名称
1	event1	ファイル1	30秒	event2
2	event2	ファイル2	60秒	event3
3	event3	ファイル3	120秒	event1

[Drawing 7]

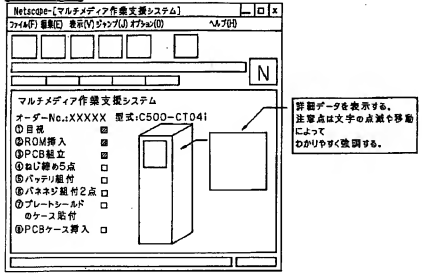
<習熟度に基づく作業標準時間との係数係数テーブル：習熟度を５段階の例>

習熟度	作業１	作業２	作業３	作業４
1	0.6	0.8	1.0	0.5
2	0.8	0.9	1.0	0.7
3	1.0	1.0	1.0	1.0
4	1.1	1.1	1.0	1.2
5	1.2	1.2	1.0	1.3

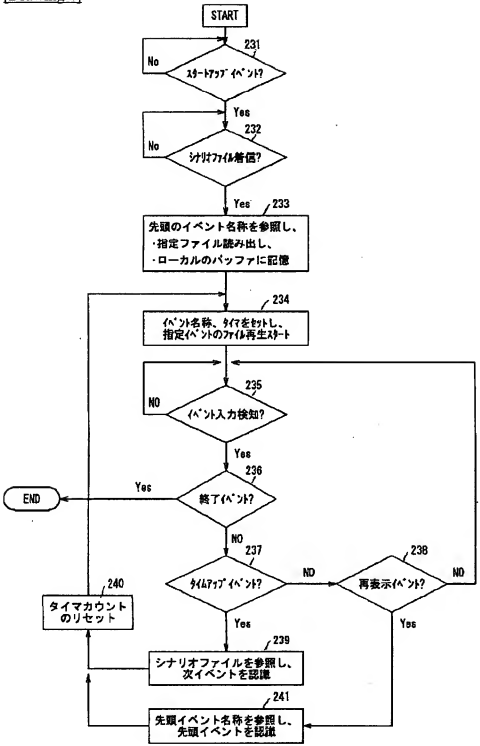
[Drawing 3]



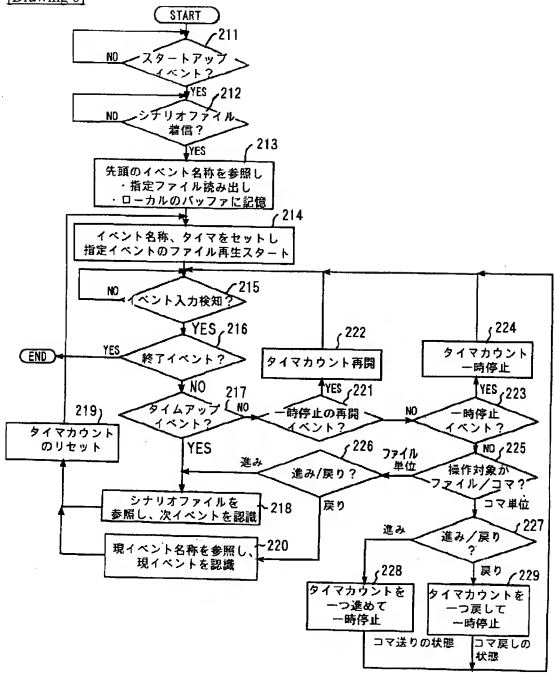
[Drawing 5]

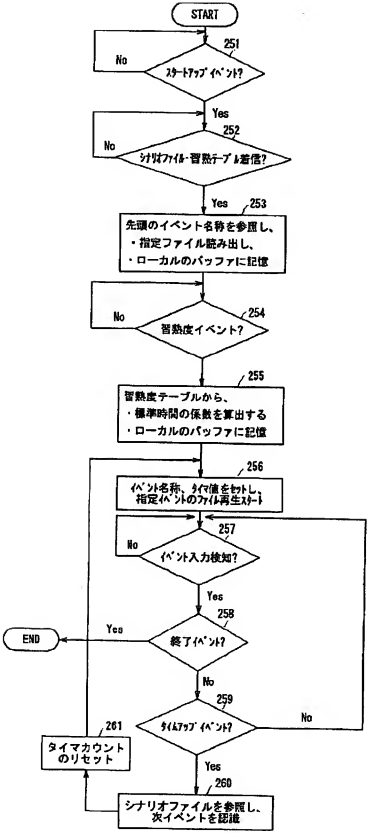


[Drawing 4]


START
231
No
ｽﾀｰﾄｱｯﾌﾟｲﾍﾞﾝﾄ?
Yes
232
No
ｼﾅﾘｵﾌｧｲﾙ着信?
Yes
233
先頭のイベント名称を参照し、
・指定ファイル読み出し、
・ローカルのバッファに記憶
234
ｲﾍﾞﾝﾄ名称、ﾀｲﾏをｾｯﾄし、
指定ｲﾍﾞﾝﾄのﾌｧｲﾙ再生ｽﾀｰﾄ
235
NO
ｲﾍﾞﾝﾄ入力検知?
Yes
236
Yes
END
終了ｲﾍﾞﾝﾄ?
NO
237
ﾀｲﾑｱｯﾌﾟｲﾍﾞﾝﾄ?
ND
238
再表示ｲﾍﾞﾝﾄ?
ND
240
タイマカウント
のリセット
Yes
239
シナリオファイルを参照し、
次イベントを認識
Yes
241
先頭イベント名称を参照し、
先頭イベントを認識

[Drawing 6]


START
211
NO
スタートアップイベント？
YES
212
NO
シナリオファイル着信？
YES
213
先頭のイベント名称を参照し
・指定ファイル読み出し
・ローカルのバッファに記憶
214
イベント名称、タイマをセットし
指定イベントのファイル再生スタート
NO
215
イベント入力検知？
YES
216
終了イベント？
YES
END
NO
217
タイムアップイベント？
NO
YES
219
タイマカウントのリセット
222
タイマカウント再開
YES
221
一時停止の再開イベント？
NO
224
タイマカウント一時停止
YES
223
一時停止イベント？
NO
225
ファイル単位
操作対象がファイル／コマ？
コマ単位
226
進み
進み／戻り？
戻り
218
シナリオファイルを参照し、次イベントを認識
220
現イベント名称を参照し、現イベントを認識
進み
227
進み／戻り？
戻り
228
タイマカウントを一つ進めて一時停止
229
タイマカウントを一つ戻して一時停止
コマ送りの状態
コマ戻しの状態


START
251
No
スタートアップ イベント?
Yes
252
No
シナリオファイル・習熟テーブル着信?
Yes
253
先頭のイベント名称を参照し、
・指定ファイル読み出し、
・ローカルのバッファに記憶
No
254
習熟度イベント?
255
習熟度テーブルから、
・標準時間の係数を算出する
・ローカルのバッファに記憶
256
イベント名称、タイマ値をセットし、
指定イベントのファイル再生スタート
257
No
イベント入力検知?
Yes
258
END
Yes
終了イベント?
No
259
No
タイムアップ イベント?
261
タイマカウント
のリセット
Yes
260
シナリオファイルを参照し、
次イベントを認識

[Drawing 8]